

Cumulative impact of wind energy on Red Kite population in Wallonia (Belgium)

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Introduction

The impact of wind energy on European raptor populations is a matter of concern considering the high number of carcasses found under wind turbines (WT). We studied the impact of existing and future wind turbines in Wallonia (Belgium) on the European-endemic Red Kite, considering the ambitious goal of the regional government to multiply by 3 the wind power capacity in the next 6 years. Wallonia hosts ~550 breeding pairs, mainly in the Eastern side of the region.

Methods

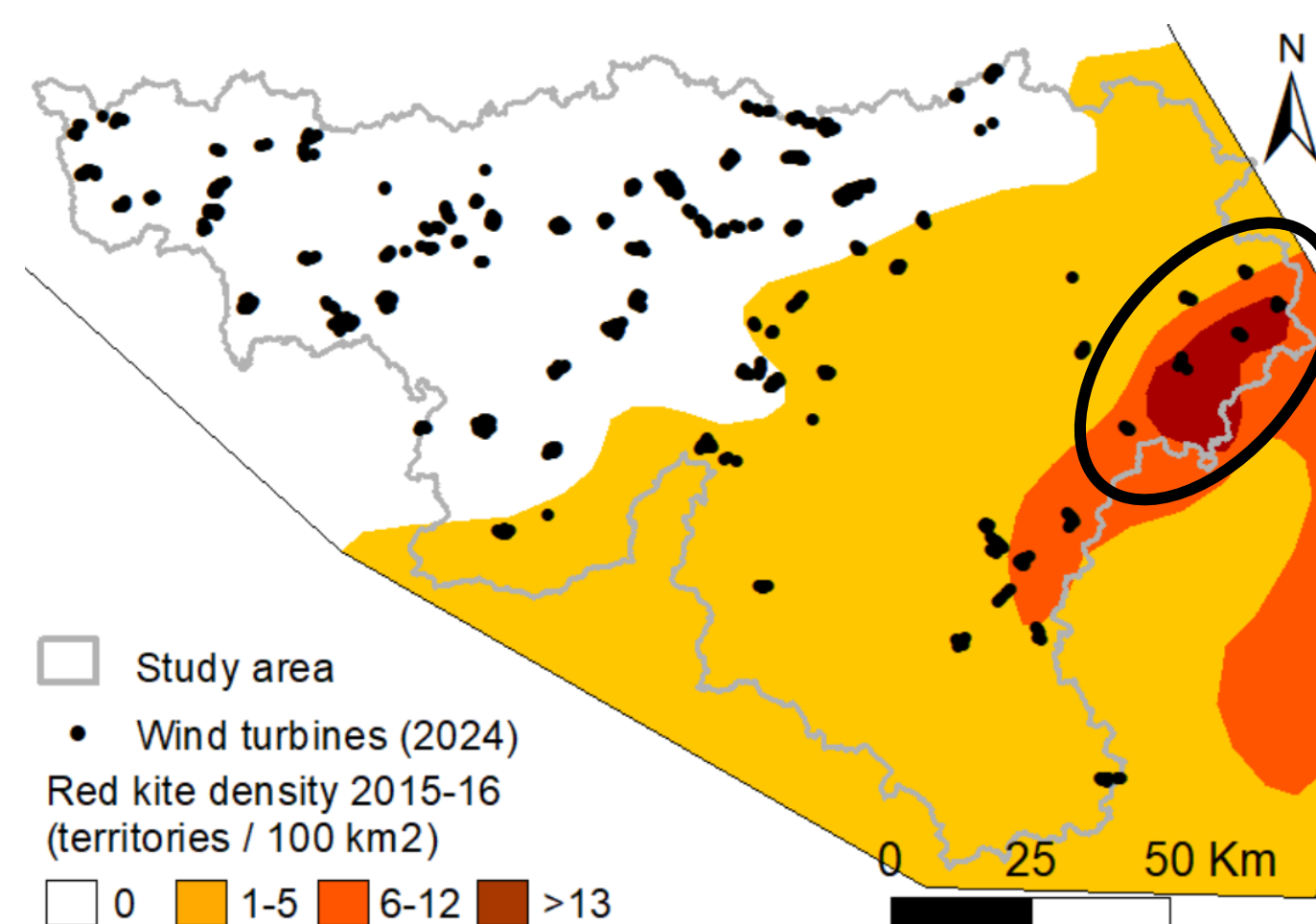
1 Measuring present-day fatality rate in the core breeding range



- Core breeding range = ~800 km² in Eastern Belgium, 31 WT in 2024
- 10 WT monitored in 2018, 9 WT in 2023
- **1.000 carcass searches**, radius of 100 m around WT (transects with human + UAV)
- Searcher efficiency and carcasses persistency tests with dead raptors

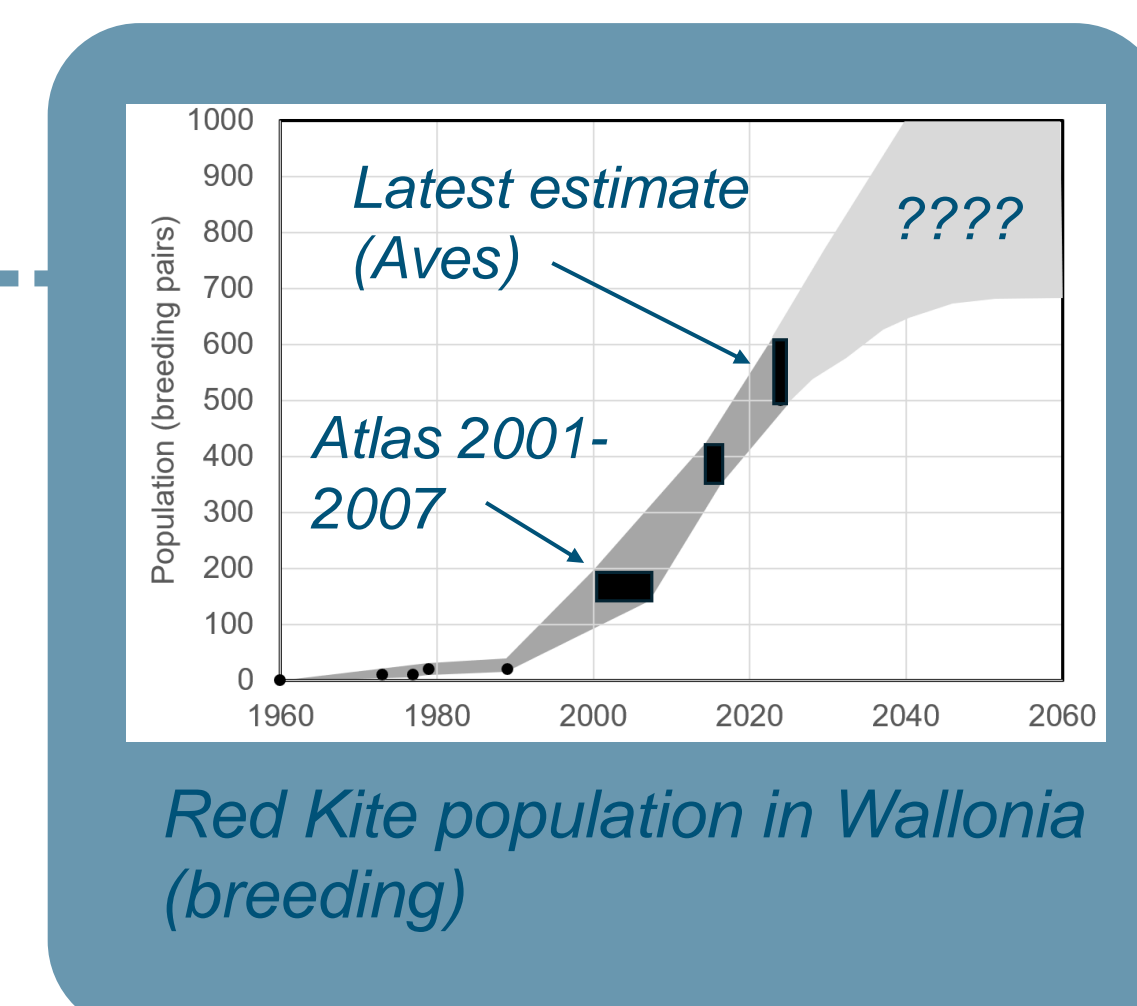
2 Extrapolation to the whole region

- Assumption : fatality rate per wind turbine decreases linearly with Red Kite density



3 Scenarios for future wind energy development (2024-2054)

- We developed 7 scenarios around the government's target, including repowering of existing wind farms
- Repowering increases fatality rate per WT by ~1.25 (Schaub, 2024)



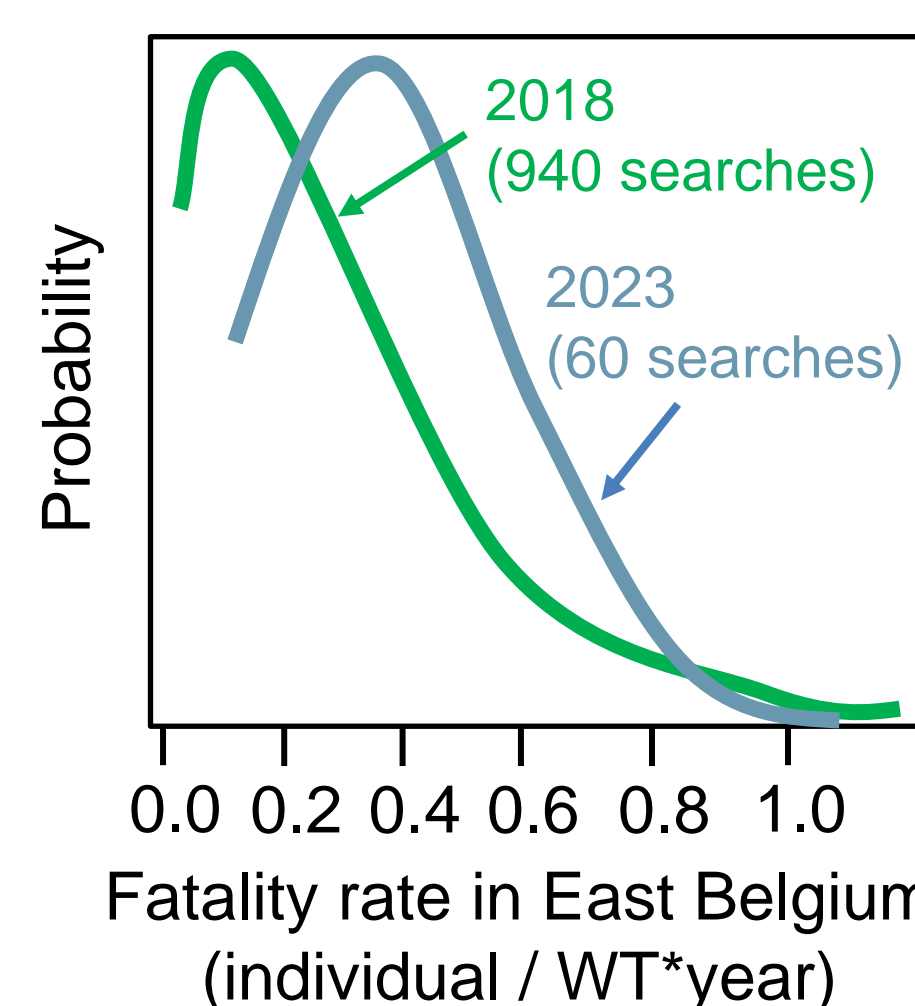
4 Link between wind energy development and fatality rates

5 Population viability analysis (2024-2054)

- We used the EolPop tool (French MAPE project)
- Static approach : all new wind turbines are already built in 2025
- Specific analyses to estimate the carrying capacity from demographic data (challenge !)

Results

- Present-day fatality rates in the core breeding range (Eastern Belgium, 31 WT) : ~6 individuals / year
- Present-day fatality rate in Wallonia (590 WT) : ~21 individuals per year
- 7 scenarios for future wind energy development between 2,000 and 10,000 GWh/yr (table)
- Population viability analysis:
 - Results are very sensitive to initial population growth rate (4 to 6,8 %) and estimated carrying capacity
 - In most scenario combinations, trends remain positive, but the impact on the final population size is clear (0 to 37%)

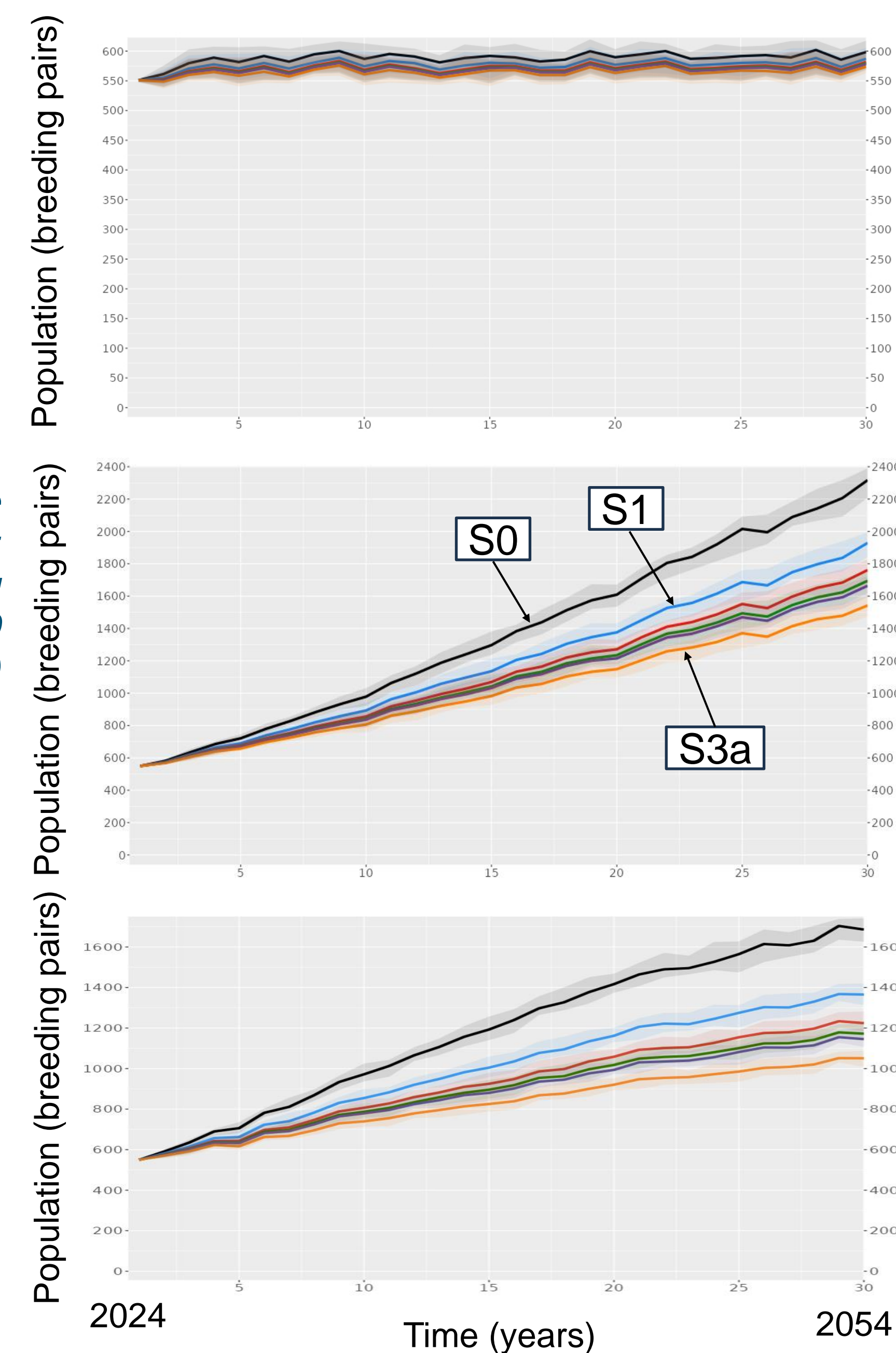


Results of the systematic carcass searches in East Belgium

Low growth rate (4-4.2 %/yr); low carrying capacity (595 breeding pairs)

High growth rate (6.6-6.8 %/yr); high carrying capacity (3,340 breeding pairs)

High growth rate (6.6-6.8 %/yr); medium carrying capacity (2,018 breeding pairs), fatality rate per WT increased by 50 % to consider potential underestimate



Scenarios for future (2054) wind energy development in Wallonia and estimated annual fatality

Name	Description	Number of wind turbines	Annual wind power production (GWh)	Estimated annual Red Kite fatality (individuals and rate at the beginning of each simulation)
S0	All wind turbines are dismantled after 2024	0	0	0 (0 %)
S1A	No new wind turbine after 2024, no new repowering	596	2,205	21 (1.1 %)
S1B	No new wind turbine after 2024, repowering of old turbines (>= 20 yrs)	596	3,854	22 (1.1 %)
S2A	The objective of 6,200 GWh/yr in 2030 is reached . After 2030, the increase is slower due to the progressive saturation of the territory. Spatially homogeneous growth	931	7,877	37 (1.9 %)
S2B	Same as S2A but lower growth in East Belgium to protect the Red Kite core breeding range	931	7,877	30 (1.6 %)
S3A	Same as S3A but stronger growth after 2030	1,108	10,000	45 (2.3 %)
S3B	Same as S2B but stronger growth after 2030	1,108	10,000	34 (1.8 %)

Automatic bird detection systems

- CSD Engineers was involved in the testing of SafeWind (field tests in 2022 with ornithologists in West Belgium, target species : Harriers) and parameterization of BPS (advice in the parameterization in Luxembourg in 2024, no field test, target species : Red Kite)
- SafeWind :
 - Good detection performances in a radius of 100-150 m
- Bioseco :
 - Many stops when the reaction distance was set up at 400 m
 - We advised to reduce to 300 m and add an altitude threshold
- These tools (+ others like IdentiFlight) seem very relevant to mitigate the collision risk for large birds
- If used to completely avoid the risk, detection and reaction distances need to be very large and could induce significant production losses in areas where the densities of target species or very similar species are high (e.g. Common Buzzards). We advise to consider these tools as mitigation measure

Conclusion and recommendations

- As long as the natural growth in the Red Kite population is $\geq 3-4\%$ / yr, wind farm development in Wallonia is unlikely to hinder population growth
- However, without mitigation measures, wind farms are expected to kill annually 21 to 45 Red Kites and will have an impact on population size
- We recommend to improve the monitoring of raptor population size and productivity in Wallonia (Red Kite, Common Buzzard and Kestrel) to make sure that the impact of wind energy will not become a threat in the future